INFLUENCE OF STRUCTURAL DEFECTS OF NITROGEN-DOPED GRAPHENECOATING ON CORROSION RESISTANCE OF CU FOIL

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The results of XPS measurements (core levels and valence bands) of copper foil covered by nitrogen-doped graphene (NG/Cu composite) using the thermal CVD technique are presented. Two series of samples were prepared with formation of pyridinic-like and graphitic-like nitrogen atoms identified by XPS N 1s spectra. XPS Cu 2p-spectra for NG/Cu composite with graphitic-like nitrogen dopants were found to be identical to those of Cu-foil covered by undoped graphene and pure Cu metal. On the other hand, Cu 2p-spectra of NG/Cu composite with pyrrolic-like nitrogen atoms show the charge-transfer satellites tructure typical for CuO which can be related to partial oxidation of Cu-foil. This conclusion is supported by measurements of XPS survey spectra which show the increasing of oxygen content ~3.6 times for NG/Cu composite with pyridinic-like nitrogen atoms and XPS valence band spectra where for this sample the O 2s-bonded states are revealed. The formation of pyrrolic-like defects leads to breaking of C-C bonds in graphene sheet and creation of edge C-atoms terminated by oxygen atoms which is confirmed by XPS C 1s-spectra. Basing on these measurements one can conclude that controlled pin-hole-free NG coverage provides a good oxidation resistance of copper metallic surface.

ОПРЕДЕЛЕНИЕ СОСТАВЛЯЮЩИХ ИМПЕДАНСА

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DETERMINATION IMPEDANCE COMPONENT

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The effectiveness of innovation, in contrast to the prior art, due to the definition of the components of biological objects on the normalized impedance parameters of pulsed dynamic characteristics (IDH).